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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

RAVI K. KAVURI et al.

Serial No.: 10/033,503

Filed: December 27, 2001

For: VIRTUAL VOLUME MANAGEMENT SYSTEM AND METHOD

Attorney Docket No.: 2001-028-NSC (STK 01028 PUS)

Group Art Unit: 2163

Examiner: Fernandes, C.M.

**RESPONSE TO NOTIFICATION  
OF NON-COMPLIANT APPEAL BRIEF**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
U.S. Patent & Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed September 29, 2006, and pursuant to MPEP § 1205.3, Applicants submit herewith a revised "Summary Of Claimed Subject Matter" section of the Appeal Brief filed on May 30, 2006.

In that regard, the Notification indicated that the original "Summary Of Claimed Subject Matter" section of the Appeal Brief failed to correlate each of the independent claims with the summary set forth. No other deficiencies in the Appeal Brief were indicated in that Notification. Applicants' filing of this revised "Summary Of Claimed Subject Matter" section is a *bone fide* attempt to respond to and comply with the Notification, and entry of the revised section is therefore respectfully requested.

**CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8 (FIRST CLASS MAIL)**

I hereby certify that this paper, including all enclosures referred to herein, is being deposited with the United States Postal Service as first-class mail, postage pre-paid, in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, U.S. Patent & Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 on:

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## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

In order to improve data management, multiple physical storage devices, such as magnetic disk drives, can be grouped into sets or “pools.” Pooling allows a set of specified physical disks to be abstracted as a single entity. Using pooling, when a logical or “virtual” disk is created, a user can specify a single pool of physical disks from which storage space is to be taken, rather than having to enumerate all physical disks that might be acceptable. In such a fashion, a single virtual disk may be presented to a user, while multiple pooled physical disks are specified and employed for actual storage of the user’s data. (*See*, Specification, p. 5, ll. 11-27.)

It is known to use disk pooling in a Redundant Array of Independent/Inexpensive Disks (RAID). An exemplary disk pooling instance, such as may be embodied in a RAID enclosure, is shown in Figure 1. A subset of physical disks (12A, 12B, 12C) is grouped or allocated to a pool (14). A virtual disk (16) is provided in communication with pool (14). As a result of the pooling, virtual disk (16) can obtain storage space only from physical disks (12A, 12B, 12C), and cannot obtain storage space from physical disk (12D). Figure 2 shows a RAID enclosure (20) that includes multiple physical disk drives (22i, 22ii, 22iii, . . . 22n), as well as an internal controller (24). Controller (24) pools the multiple disks (22i, 22ii, 22iii, . . . 22n) in order to present a single virtual disk (not shown). (*See*, Specification, p. 5, l. 28 - p. 6, l. 21.)

However, because RAID enclosures involve pooling of a fixed number of disks that are captive within the enclosure, storage capacity is only as extensible as the physical enclosure with its fixed number of disks allows. While larger RAID enclosures may be manufactured with more disks, a limit always exists on the number of disks that can ultimately be included. That is, an arbitrarily large physical enclosure is simply not possible. Similarly, while an existing RAID enclosure may be stocked with disks having greater storage capacity,

it is not certain that a user's storage capacity requirements can continually be met by such "denser" RAID enclosures. (*See*, Specification, p. 6, l. 22 - p. 7, l. 2.)

**Independent Claims 21, 26, 31 and 36**

The claimed invention is directed to automatic allocation of a storage device to a pool. More specifically, as an example, a user wishing to add a storage device in a storage area network need not identify which servers will use the device and then install the appropriate software driver on all such servers. Instead, the claimed invention automatically assigns the device to a pool, accounting for and handling any differences between storage devices so that such differences are not apparent to a user. As a result, a user need not be involved. (*See*, Specification; p. 7, l. 3 - p. 9, l. 13.)


With reference to independent claims 21, 26, 31 and 36, Figure 3 shows a storage area network (SAN) (32) that comprises a plurality of virtual storage volumes (34, 36) available to a user for use in storage and retrieval of data. A controller (40) automatically allocates at least two of a plurality of network storage devices (*e.g.*, storage devices (38A, 38B, 38C) as shown in Figure 3) to a storage pool (42) and links at least one of the plurality of virtual storage volumes (*e.g.*, virtual storage volumes (34, 36) as shown in Figure 3) to the pool (42). Controller (40) performs such disk pooling inside of SAN (32) (*i.e.*, outside of a RAID enclosure or a server). As a result of the pooling, virtual storage volumes (34, 36) can obtain storage space only from network storage devices (38A, 38B, 38C), and cannot obtain storage space from network storage device (38D). In contrast to disk pooling in a RAID enclosure, however, whenever a user or an application requires additional disk storage space in the SAN, that need can be readily addressed by the addition of one or more additional storage devices to the appropriate pool. (*See*, Specification, p. 9, l. 14 - p. 10, l. 14.)

**CONCLUSION**

Applicants' filing of the above revised "Summary Of Claimed Subject Matter" section is a *bone fide* attempt to respond to and comply with the Notification of Non-Compliant Appeal Brief mailed September 29, 2006. Entry of the revised section is therefore respectfully requested.

Respectfully submitted,

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